



# Assessment and Evaluation of Indira Canteen on Food Security and Food Safety in Urban Bengaluru

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## Data of the article

First received : 29 December 2021 | Last revision received : 12 June 2022

Accepted : 07 October 2022 | Published online : 25 October 2022

DOI : 10.17170/kobra-202210056934

## Keywords

Food safety; Food security; Cost-effective; Food handlers; Consumer

Food security is a major cause of concern in developing and underdeveloped countries. It is a serious challenge for governments to provide subsidized and safe food to deserving sections of society. Inspiration from the success of Amma canteen led to an initiative by the Karnataka government concerning the subsidized food program, Indira canteen. Food safety will determine the success or failure of the scheme; therefore, this study aims to assess the effectiveness of the canteen in terms of food safety and food security. Random sampling method was used to select 70 food handlers and 150 consumers from Bengaluru. The data was collected using a pretested questionnaire and using the interview cum observation technique. Results revealed that the majority (71.4%) of the food handlers have been trained in food safety before joining the job. A significant difference was observed between trained and untrained food handlers in following the food safety norms while handling the food ( $p < 0.05$ ). Results revealed that the majority of the consumers (87.3%) were male and only 12.7% were females. About 44% belonged to the lower middle class and only 1% to the upper-middle-class. It was observed that 70% of the consumers skipped at least one meal and 65.3% restricted variety in food due to the cost of the meal. About 97.3% of consumers were satisfied with the cost-wise quality of food served in the canteen. Overall acceptance of food in the canteen was 94.6%. Hence it can be concluded from the study that Indira canteen is a successful and effective venture for food security by the Karnataka government that is, capable of providing subsidized and safe food to consumers.

## 1. Introduction

The implementation of the public distribution system in India has been successful in combating hunger in the below-poverty-line population. According to a report on Global Hunger Index (2018), India is ranked in the 103rd position among 119 countries, which makes India stand among the 45 countries that have a serious level of hunger which is alarming. The public distribution system ensures food safety and food security which are intended for improving the nutritional

status. This is based on the three main objectives i.e., to protect the poor, to enhance their nutritional status, and to generate moderate influence on the market price. The problem of food insecurity in India has been tried to rectify over the decades by both the central and the state governments through the Public Distribution System (PDS). Regulation of PDS is carried out by the central government which is responsible for procurement of the grains, their storage, trans-



portation, and the majority of the bulk distribution. The state governments carry out accountability for distributing the food grains to the consumers through the established network of ration shops or fair price shops.

Several studies have emphasized that poverty declines at a much lesser rate in urban setups when compared to rural setups (World Food Program 2010). The government of India has efficiently worked on two concerning issues to tackle the problem of food insecurity. The first issue is reducing poverty by providing employment and the other one is to provide subsidized food grains and essential items through a public distribution system. In addition to this many state governments have introduced schemes like food canteens which provide one or more meals at subsidized rates.

Food safety by Food and Agriculture Organization (FAO) has been defined as “the condition and measures that are necessary during the production, processing, packaging, storage distribution and preparation of the food to ensure that it is safe, sound, wholesome and fit for human consumption.” The three main sources which affect food safety can be classified as physical, chemical, and biological agents. Their presence in food has the potential to cause adverse health consequences. Food subsidized canteens should take major precautions concerning food safety as it can either step towards the success or failure of the program.

Food handling with hygienic standards should be practiced and maintained. Food handler involved in the process of food handling plays a very crucial role in the safety of the food. Every individual involved in the food handling process must be well educated about food safety measures and their standards. The food handlers must be scrupulous in their knowledge, attitude, and practice about food safety. If there is a lack of knowledge and improper practice by the food handlers, it can be a major contributing factor to food-borne illness. Food handlers may be carriers of food-borne pathogens such as hepatitis, salmonella typhi, noroviruses, staphylococcus aureus, and Shigella species which may be present in the hands, mouth, skin, hair, nails, etc. Therefore, proper hygienic practices should be followed, such as hand washing, brushing, bathing, and clipping nails to avoid the contamina-

tion of the food. However, regular food safety training classes with recent updates and concepts of health, hygiene, and food safety standards must be taught to the food handlers as this will have a positive impact on their knowledge, attitude, and practice. Food hygiene practices must be improved in the community which is to safeguard the handlers against food-borne illnesses (Raphael et al., 2018).

The practice of safe food handling and storage is a very important step as during the process of receiving the raw ingredients if any contamination or moisture in the dry grains is present can lead to the growth of bacteria and cause spoilage of the food. The concept of FIFO (first in first out) where the items which are bought first should be out from the storage and be used first or FEFO (first expiry first out) where the items which have the closer expiry date should be taken out of the storage area and should be used before the expiry date are appropriate to follow. A study strongly emphasizes the need for a properly designed food safety public education campaign, to enhance food safety consciousness in customers and thus avoid foodborne disease (Vyas and Khuswaha, 2017).

Indira Canteen is the new initiative of the Karnataka government in continuation of the Anna Bhagya Scheme. For this project, a 100-crore fund was allotted. Indira canteen was based on the “HUB AND SPOKE MODEL” where each assembly constituency will have one kitchen which will, in turn, cater to the wards in its jurisdiction. The canteens were launched on 15th august 2017 (Indira Canteen – Apps on Google Play, 2020). They are spread throughout the Bengaluru zones (east zone, west zone, south zone). The main aim of these canteens is to provide food at subsidized rates to the population who is below the poverty line or to the economically backward sections of society which will help in food security promising food safety to prevent infections and malnutrition.

The canteen functions on all seven days of the week and provides all three major meals to its customers at subsidized rates as rupees 5 for breakfast and rupees 10 for lunch and dinner, respectively. There are 198 wards operated by two vendors, 100 wards by one vendor, and 98 by the other vendor. The canteen follows a weekly cyclic menu which is wholesome traditional meals. The menu items for breakfast include 8 items, whereas lunch and dinner include 9 items. This study

aims to evaluate the effectiveness of Indira canteens in terms of food safety and food security.

## 2. Materials and methods

### 2.1 Study area

A cross-sectional study was conducted in Bengaluru city. The duration of the study was from November 2019 to February 2020. Food handlers and consumers were assessed with the help of a pre-structured, in-depth questionnaire on food safety and hygiene. A survey was conducted among the consumers from the east, west, north, south, and central zone of Bengaluru city, who were consuming food from these canteens. This study was conducted to assess the effectiveness of Indira canteens in terms of food safety and food security. Two canteens were selected from each of the five zones for this study. From every canteen, 15 consumers and 7 food handlers were interviewed using a pre-structured questionnaire. A total of 220 subjects were studied, out of which 150 were consumers and 70 were food handlers. This study also included a visit to the centralized kitchen of the Indira canteen to study the functioning of the kitchen.

### 2.2 Tools and Techniques

The tool used for this research study was a questionnaire for food handlers and consumers. The method of interview cum questionnaire was used to collect the data. This questionnaire was divided into two-part, one for food handlers and another for food consumers of the Indira canteen.

The questionnaire for food handlers of the Indira canteen was divided into two sections. The first part had information about the consumers like general information, canteen setup, food security, cost-effectiveness, food quality, and quantity in Indira canteen. The other part included specific information on the assessment of knowledge and practice of food handlers regarding food safety and hygiene.

### 2.3. Data Collection

The main aim of this research was to assess food safety, food security, and the effectiveness of the Indira canteen. The study subjects were informed before administering the questionnaire and were interviewed. A

well-structured and in-depth questionnaire was used to assess the knowledge and practice of the consumers and the food handlers of the Indira canteen. The questions were asked in English, Hindi, Urdu, and Kannada. The data was collected from the 150 consumers and 70 food handlers belonging to Bengaluru's east, west, north, south, and central wards.

The data collected was compiled and the analysis of data was computed using various statistical tools.

## 3. Results

The majority of the respondents (36%) belonged to the age group of 25-40 years and out of that males (87.3%) outnumbered females (12.7%). Out of the total respondents, 58.7% were married and the maximum respondents (44%) belonged to the lower middle class following Kuppuswamy modified scale (Wani, 2019). About 62% of respondents were from rural setups (Table. 1).

It was observed from table (2) that 62% of the respondents regularly consumed food outside and 11.3% were not consuming food regularly. About 64% were regular customers of Indira canteen and only 8% were not regular to the canteen. The consumption of lunch was higher (51.3%) and the lowest consumed meal was dinner (2.7%). As the majority of respondents (70 %) consumed one meal in the canteen, they tend to skip other meals of the day as they could not afford them. Almost 50% of the respondents (52.7%) regularly consume one meal in the canteen. The maximum number of respondents (92.7%) agreed that canteen timing was appropriate as per their requirements. Most of the respondents (68%) answered that there is no alternative to this canteen at present.

Table (3) depicts that the majority (68%) of the respondents rated the taste of the food as very good. The quality of the food was rated as very good by 64% of the respondents. About 88% of the respondents agreed that the quantity of the food given was fulfilling. It was revealed that 65.3% of respondents rated food hygiene while serving the food as very good. The ratings for the hygienic conditions of serving equipment and utensils were also rated as very good (68%). It was seen that 88% of respondents agreed that food served in the canteen helped in meeting their nutritional requirements. About 89.3% of respondents

were satisfied with the menu of the canteen. The majority (97.3%) of the respondents were fully satisfied with the cost of the food with respect to the quality of food being served in the canteen when compared to other outlets.

**Table 1.** Socio-demographic characteristics of consumers

Socio-demographic characteristics	Category	Respondents	
		Number	Percent
Age group (years)	16-25	53	35.3
	25-40	54	36.0
	40-70	43	28.7
Gender	Male	131	87.3
	Female	19	12.7
Food habits	Vegetarian	50	33.3
	Non-vegetarian	100	66.7
Marital status	Unmarried	62	41.3
	Married	88	58.7
Religion	Hindu	116	77.3
	Muslim	26	17.3
	Christian	8	5.4
Socio economic status	Upper middle class	1	1
	Lower middle class	67	44
	Upper lower class	33	22
	Lower class	49	33
Type of family	Nuclear	64	42.7
	Joint	86	57.3
Place of Residence	Rural	93	62.0
	Urban	57	38.0

**Table 2.** Food habits of the respondents and convenience of the canteen

Characteristics	Response	Respondents	
		Number	Percent
Regularly eat outside food	Yes	93	62.0
	No	17	11.3
	Sometimes	40	26.7
Regularly eating in the specific canteen	Yes	96	64.0
	No	12	8.0
	Sometimes	42	28.0
Meals consumed in the canteen.	Breakfast	41	27.3
	Lunch	77	51.3
	Dinner	4	2.7
	All the above	28	18.7

**Continue table 2.** Food habits of the respondents and convenience of the canteen

Characteristics	Response	Respondents	
		Number	Percent
Skip any of the meals	Yes	105	70.0
	No	30	20.0
	Sometimes	15	10.0
Frequency of eating in the canteen	Every day	79	52.7
	Alternative days	20	13.3
	Once a week	13	8.7
	Occasionally	38	25.3
Food availability whenever wants to eat in the canteen.	Yes	145	96.7
	No	5	3.3
Timing of the canteen is appropriate.	Yes	139	92.7
	No	11	7.3
Have an alternative meal option outside.	Yes	41	27.3
	No	102	68.0
	Sometimes	7	4.7

**Table 3.** Rating of the canteen on quality and quantity of food

Parameters	Response	Respondents	
		Number	Percent
Rating the taste of the food	Very good	102	68.0
	Good	37	24.7
	Average	11	7.3
Rating the quality of food	Very good	96	64.0
	Good	43	28.7
	Average	11	7.3
Feel the quantity of food served is sufficient.	Fully	132	88.0
	Partially	18	12.0
Rating the food hygienic for served food	Very good	98	65.3
	Good	43	28.7
	Average	9	6.0
Hygienic conditions of serving equipment and utensils	Very good	102	68.0
	Good	37	24.7
	Average	11	7.3
Feel food served will meet their nutrition requirements.	Yes	132	88.0
	No	7	4.7
	Maybe	11	7.3
Satisfied with a variety of food items served.	Yes	134	89.3
	Sometimes	16	10.7
Cost wise quality of food served in the canteen in comparison to other outlets	Yes	146	97.3
	No	4	2.7

**Continue table 3.** Rating of the canteen on quality and quantity of food

Parameters	Response	Respondents	
		Number	Percent
Cost wise quality of food served in the canteen in comparison to other outlets	Yes	146	97.3
	No	4	2.7
Acceptance of subsidized food through the canteen	Yes	142	94.6
	No	4	2.7
	Maybe	4	2.7

Table 4 depicted the status of the food security of the respondents, where 73.3% had enough food with the variety available however 3.3% had food often but not sufficient. About 68.7% of the respondents had enough food stored for 30 days for the whole family and 14.6% were not sure about it. Around 60% of the respondents were unable to afford a balanced meal for themselves and their families and 4.7% of the population could not afford a balanced meal once every week. The data also revealed that 77.3% of the respondents agreed that they were able to eat a balanced meal at both the places i.e., the canteen, as well as home whereas only 6.7% of the respondents, said they were able to eat a balanced meal only at the canteen. Similar results to this were seen in the case study of Annapurna canteen (TISS, 2020) where some respondents revealed that if the canteen was not functioning someday then they cannot eat food anywhere as they are unable to afford a balanced meal.

Tables (5, 6 & 7) revealed that the maximum (54.5%) respondents were in the age group 16-25 years. Association between age group and taste has been found significant at 5% level. The association between age groups and rating the food hygiene in the canteen revealed that 33.3% of the respondents in the age group of 16-25 years and 33.3% of the respondents in the age group of 25-40 years rated the hygiene as very good. However, no significant difference was observed in the association between age and rating of food hygiene. The association between age groups and the sufficiency in the amount of food served in the canteen shows that 37.1% of respondents in the age group of 16-25

years were fully satisfied and 55.6% of the respondents in the age group of 25-40 years were partially satisfied with the amount of food served in the canteen. However, no significant difference was observed in the association between age and the sufficiency in the amount of food served.

Table 8 showed that 80% of the respondents preferred idly with chutney/sambhar for breakfast whereas only 10% of each preferred Puliogare with pudina chutney and Pongal with tomato gojju respectively. The reason for the preferred breakfast showed that 62.7% opted for all the given factors i.e., cost, taste, quality, quantity, and timings whereas only 2.7% of the respondents preferred eating breakfast in the canteen for the quantity of the food provided. However, results showed in the case study conducted in the Annapurna canteen (TISS, 2020) where 73.4% of respondents who belonged to the informal sector and 47.78% of respondents who were migrants were regular to the canteen due to the cost factor.

Table 9 showed that the majority (82.7%) of the respondents in lunch preferred Anna-mixed veg sambhar and curd rice whereas, only 0.7% preferred Methya (fenugreek) pulao & curd rice. The reason for the preferred lunch showed that 57.3% opted for it because of all the given factors i.e., cost, taste, quality, quantity, and timings whereas, only 2.7% of the respondents preferred eating lunch in the canteen for the quantity of the food given.

Table 10 showed the socio-demographic character-



istics of the food handlers. It was revealed that the majority of the food handlers (54.3%) belonged to the age group of 20-29 years. Gender-wise distribution of food handlers shows that the maximum number of food handlers was male (70%). About 35.7% of the food handlers had completed their Pre-University College (PUC). The maximum number of food handlers was Hindus. The majority (82.9%) of food handlers were non-vegetarian whereas 17.1% of them were vegetarian. About 67.1% of the food handlers lived in a joint family. The majority (97.1%) of them were from the urban setup.

Table 11 portrayed that a maximum (51.4%) of the food handlers were involved in the serving of food. The work experiences of the food handlers revealed that 35.7% of them had an average work experience of below 1 year.

Table 12 revealed that 71.4% of the Food handlers had undergone food safety training before beginning their job and 62.9% of them had undergone training for 3 days and only 8.6% had undergone food safety training for 7 days. All the Food handlers were trained in the Bommanhalli central kitchen in Bangalore.

Association between training and food safety revealed the precautions taken by the subjects who had undergone food safety training (table 13). It was observed that 95% of the trained food handlers used precautions like closing vessels to avoid contamination whereas, this practice was observed only in 2% of the untrained food handlers. Similarly, practice like closing vessels and using different cutlery for different food items

was observed in 58% of trained food handlers as compared to untrained food handlers (5%). A statistically significant difference ( $p < 0.05$ ) was observed between the practices followed by trained and untrained food handlers.

Table 14 indicated that 95.7% of the food handlers practiced covering the food properly to protect it from spoilage/contamination post-training sessions on food safety. The place where the food was stored was mainly the refrigerator as stated by 75.7% of the food handlers. The practice of using separate cutleries for serving different food items was practiced by 90% of the food handlers. About 95.7% of the food handlers had the knowledge that bacterial contamination can spread through the food.

It was observed from table 15 that 25% of the trained food handlers had practiced hand washing and only 14% of the untrained food handlers practiced hand washing before coming in contact with the food. Association between food handling during illness among the trained and untrained food handlers was depicted in table 3.11. It was observed that 96% of the trained food handlers did not involve themselves in food handling during illness whereas 80% of the untrained food handlers did not involve in handling the food. Similarly, the practice of handling food during illness was seen in 4% of the trained food handlers compared to 20% of untrained food handlers. A statistically significant difference ( $\chi^2 = 43.20^*$ ,  $p < 0.05$ ) was observed between the association of practice followed by trained and untrained food handlers.

**Table 4.** Practice regarding food security

Aspects	Response	Respondents	
		Number	Percent
Statements define the food security situation	Enough food with the variety available	110	73.3
	Enough food without many varieties is available	6	4.0
	Often not enough	5	3.3
	Don't know	29	19.4
<b>Total</b>		<b>150</b>	<b>100</b>
Not able to afford a balanced meal	Once a week	7	4.7
	Once a month	10	6.7
	Never	43	28.6
	Don't know	90	60.0

**Continue table 4.** Practice regarding food security

Aspects	Response	Respondents	
		Number	Percent
<b>Total</b>		<b>150</b>	<b>100</b>
Consume balanced meal	At canteen	10	6.7
	At home	24	16.0
	At Both places	116	77.3
<b>Total</b>		<b>150</b>	<b>100</b>

**Table 5.** Association between age and taste

Age group (years)	Sample (n)	Rating of the taste						$\chi^2$
		Very good		Good		Average		
		N	%	N	%	N	%	Test
16-25	53	28	27.5	19	51.4	6	54.5	9.64*
25-40	54	40	39.2	10	27.0	4	36.4	
40-70	43	34	33.3	8	21.6	1	9.1	
<b>Total</b>	<b>150</b>	<b>102</b>	<b>100.0</b>	<b>37</b>	<b>100.0</b>	<b>11</b>	<b>100.0</b>	

**Table 6.** Association between age and food hygiene

Age group (years)	Sample (n)	Rating the food hygiene						$\chi^2$
		Very good		Good		Average		
		N	%	N	%	N	%	Test
16-25	53	33	33.7	17	39.5	3	33.3	3.01 <sup>NS</sup>
25-40	54	33	33.7	18	41.9	3	33.3	
40-70	43	32	32.6	8	18.6	3	33.3	
<b>Total</b>	<b>150</b>	<b>98</b>	<b>100.0</b>	<b>43</b>	<b>100.0</b>	<b>9</b>	<b>100.0</b>	

**Table 7.** Association between age and sufficiency of the food

Age group (years)	Sample (n)	Sufficient quantity of food				$\chi^2$
		Fully		Partially		
		N	%	N	%	Test
16-25	53	49	37.1	4	22.2	3.46 <sup>NS</sup>
25-40	54	44	33.3	10	55.6	
40-70	43	39	29.6	4	22.2	
<b>Total</b>	<b>150</b>	<b>132</b>	<b>100.0</b>	<b>18</b>	<b>100.0</b>	

\*Significant at 5% level,  $\chi^2$  (0.05, 4df) = 9.488  
 NS: Non-significant,  $\chi^2$  (0.05, 2df) = 5.991  
 NS: Non-significant,  $\chi^2$  (0.05, 2df) = 5.991



**Table 8.** Food preference and reasons for breakfast consumption in the canteen

Aspects	Response	Respondents	
		Number	Percent
Food preference of breakfast in canteen	Idly with Chutney/sambhar	120	80.0
	Puliogare with pudina chutney	15	10.0
	Pongal with tomato gojju	15	10.0
<b>Total</b>		<b>150</b>	<b>100</b>
Reasons for preferred breakfast	Cost	16	10.6
	Taste	21	14
	Quality	8	5.3
	Quantity	4	2.7
	Timings	7	4.7
	All the above	94	62.7
<b>Total</b>		<b>150</b>	<b>100</b>

**Table 9.** Food preference and Reasons for lunch/dinner consumption in the canteen

Aspects	Response	Respondents	
		Number	Percent
Food preference of lunch/dinner in canteen	Anna (rice) -mixed veg sambhar and curd rice	124	82.7
	Tomato bhat (Tomato rice) & curd rice chutney	6	4
	Mustard chitranna (Lemon rice) & curd rice	2	1.3
	Vanitha (brinjal rice ) & curd rice	5	3.3
	Bisi Bella bhat (Dal + rice) & curd rice	7	4.7
	Methya (fenugreek) pulao & curd rice	1	0.7
	Puliyograre (rice with spices & ground nut )& curd rice	2	1.3
	Vegetable pulao & curd rice	3	2
<b>Total</b>		<b>150</b>	<b>100</b>
Reasons for preferred lunch/dinner	Cost	29	19.3
	Taste	16	10.3
	Quality	5	3.3
	Quantity	4	2.7
	Timings	10	6.7
	All of above	86	57.3
<b>Total</b>		<b>150</b>	<b>100</b>

**Table 10.** Demographic characteristics of food handlers

Demographic characteristics	Category	Food handlers	
		Number	Percent
Age group (years)	20-29	38	54.3
	29-39	14	20.0
	39-49	12	17.1
	49-59	6	8.6
Gender	Male	49	70
	Female	21	30
Educational level	Illiterate	7	10.0
	Primary	5	7.1
	Middle	9	12.9
	High school	24	34.3
	PUC	25	35.7
Religion	Hindu	51	72.9
	Muslim	15	21.4
	Christian	4	5.7
Food habits	Vegetarian	12	17.1
	Non-Vegetarian	58	82.9
Type of family	Nuclear	23	32.9
	Joint	47	67.1
Place of Residence	Rural	2	2.9
	Urban	68	97.1

**Table 11.** Classification of respondents by job involvement and work experience

Characteristics	Category	Respondents	
		Number	Percent
Job involvement	Cooking	8	11.4
	Cleaning	16	22.9
	Serving	36	51.4
	Pre-preparation	10	14.3
Work experience	Below 1 year	25	35.7
	1.0-1.6 years	21	30
	1.7-2.0 years	24	34.3
<b>Total</b>		<b>70</b>	<b>100</b>

**Table 12.** Food safety training/Workshop attended by food handlers

Characteristics	Category	Food handlers	
		Number	Percent
Attended food safety training before starting the job	Yes	50	71.4
	No	20	28.6

**Continue table 12.** Food safety training/Workshop attended by food handlers

Characteristics	Category	Food handlers	
		Number	Percent
<b>Total</b>		<b>70</b>	<b>100</b>
Last training/workshop attended	3 days	44	62.9
	7 days	6	8.6
	None	20	28.5
<b>Total</b>		<b>70</b>	<b>100</b>

**Table 13.** Association between training and food Safety

Maintenance of Food Safety	Sample (n)	Attended training				$\chi^2$
		Trained		Untrained		
		N	%	N	%	
Closing vessels to avoid contamination	20	19	95	1	2	60.61*
Closing vessels to avoid contamination and using different cutlery for different food items	30	1	58	29	5	
Other practices	20	0	0	20	40	
<b>Total</b>	<b>70</b>	<b>20</b>	<b>100</b>	<b>50</b>	<b>100</b>	

\*Significant at 5% level,  $\chi^2 (0.05, 1df) = 3.841$

**Table 14.** Food safety practices followed in the canteen after the training

Characteristics	Category	Food handlers	
		Number	Percent
Food covered properly to protect from spoilage/ contamination.	Yes	67	95.7
	No	3	4.3
Place to Store food	Refrigerator (5.6° C)	53	75.7
	Other	17	24.3
Different utensils used for different food items	Yes	63	90.0
	No	5	7.1
	Sometimes	2	2.9
Bacterial contamination can spread through food.	Yes	67	95.7
	No	3	4.3

**Table 15.** Association between training, hands washing, and handling food during illness

Washing hands before coming in contact with food	Sample	Trained		Untrained		$\chi^2$ Test
		N	%	N	%	
Yes	12	5	25	7	14	1.22 <sup>NS</sup>
Sometimes	58	15	75	43	86	
<b>Total</b>	<b>70</b>	<b>20</b>	<b>100</b>	<b>50</b>	<b>100</b>	
Involved in handling food during illness	Sample (n)	Trained		Untrained		$\chi^2$ Test
		N	%	N	%	
Yes	52	2	4	4	20	43.20*
No	18	48	96	16	80	
<b>Total</b>	<b>70</b>	<b>50</b>	<b>100</b>	<b>20</b>	<b>100</b>	

NS : Non-significant,  
\*Significant at 5% level,

$\chi^2$  (0.05, 1df) = 3.841  
 $\chi^2$  (0.05, 1df) = 3.841

#### 4. Discussion:

A similar study was conducted by (Nirmala and Seethamma, 2018) where the result showed that the majority of the respondents visited the canteen twice a day mainly for breakfast and lunch. Results similar to this were also shown in the case study done at the Annapurna canteen (Tiss.edu, 2020). Some respondents were chronically poor and they skipped their lunch if canteens were closed, as it was hard to pay for a meal anywhere else with their earnings. This study was conducted with the aim to know the perception of the beneficiaries towards “Anna Canteen” in the District of Visakhapatnam. The research study comprised of a sample size of 153 beneficiaries which was spread among 15 Anna canteens of Visakhapatnam District. The results revealed that it was very clear that “Anna Canteen” has a great positive impact on the labour class, middle class, and poor people who are living in the Visakhapatnam District (Uday Kumar and Manjula, 2018).

Similar results were seen in a study carried out by Osaili et al. (2013) where there was higher knowledge

among the food handlers who had registered for the food safety training. Another study by Husain et al. (2016) showed that there was a significant improvement in the knowledge of personal hygiene and the rules for preparing safe food post-intervention. The overall mean score difference between the intervention and control groups was 0.67 (95 percent CI: 0.25, 1.09).

However, a meta-analysis study (Soon et al., 2012) showed results where training on food safety and intervention showed that the knowledge of hand hygiene among trained food handlers was significantly more than those of the untrained food handlers, with an effect size of 1.284 (95% confidence interval [CI] ~0.830 to 1.738) which revealed the strong evidence between food safety training and hand hygiene. It was also seen that the hand hygiene attitudes and self-reported practices were observed with an effect size of 0.683 (95%CI ~0.523 to 0.843). Food safety training increased the knowledge and improved attitudes among the food handlers toward hand hygiene practices. Behera and Penthoi, (2017) carried out a study that aimed to find the reasons for the status and the



factors which were the causes of the food insecurity in the state of Odisha. The data collected through the secondary sources showed the significant cause behind the problem of food insecurity in the state of Odisha was inadequate power to purchase food.

## 5. Conclusion

India's malnutrition is to be combated at the earliest, as its ranking of India in the Global hunger index (GHI) is declining which is undesired for the development of the country. Malnutrition is also caused by growing inflation and unemployment. Therefore, the state government of Karnataka has initiated the project of subsidized food through the Indira canteen. However, the success rate of this canteen not only depends on providing subsidized food to the population but also depends on food safety and hygiene. Therefore, the knowledge and practice of food handlers have a significant role in delivering safe food to consumers.

Hence it can be concluded from the present study that the Indira canteen is a successful and effective venture by the Karnataka government as the canteens were capable of providing subsidized and safe food to the consumers. The lower socio-economic section of society was also able to be benefitted from the scheme. But this scheme should take measures in reaching out to the larger section of the deserving population in Karnataka. Therefore, irrespective of the political regime, schemes like these must be continued for the welfare of society and to tackle the food security status of the population.

## Conflict of Interests

The authors declare that there are no conflicts of interest.

## Acknowledgements

The authors acknowledge Mount Carmel College Management for funding this study. Also acknowledge the support of Sri Venkatesh S, Finance commissioner BBMP for granting the permission to carry out this research study.

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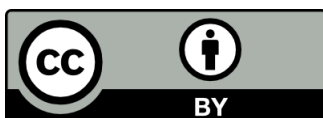
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